MacDougal, and a very interesting and copiously illustrated report it is.

As some of our readers may care to see this publication, we may add that it is issued by the Carnegie Institution of Washington, U.S.A. (publication No. 6).

Vast as is their territory, and numerous as are their experimental stations and like institutions, our cousins are not yet satisfied. They have invaded British territory, in a most genial and friendly manner it is true, but still they have annexed, with our consent, a portion of the island of Jamaica, and there they have established, at "Cinchona," a botanical laboratory and research station open to the students of all countries. The direction is in the hands of Dr. Britton, of the New York Botanical Garden, in cooperation with Mr. Fawcett, the Director of Public Gardens and Plantations in the island. The policy of the "open door" pursued by the Americans in these matters prevents us from doing anything but acquiesce in their proceedings. But why what should have been a plain duty for us should have been allowed to be undertaken by others is a mystery.

We do not question the utility of ironclads and cruisers as protectors of our commerce, but it is obvious to those who are watching the proceedings of our neighbours and of our rivals that if we do not largely extend our scientific training and induce our wealthy citizens to follow the example of their American brethren in endowing science, the necessity for protection will vanish, and that not slowly.

NOTES.

RECOGNISING the great and immediate importance of investigation of the nature and properties of radium and radioactive bodies, the court of the Goldsmiths' Company recently signified its willingness to hand over a sum of 1000*l.* to the Royal Society to constitute a radium research fund. The council of the Royal Society at once accepted the duty of administering this grant, and ordered the cordial thanks of the society to be transmitted to the Goldsmiths' Company for its generous and timely subvention to scientific research. Proposals relating to the method of utilising the fund for the assistance of scientific investigation have at the same time been communicated to the company for its approval.

THE fiftieth anniversary of Sir H. E. Roscoe's graduation at Heidelberg is to be celebrated on April 22 by a reception at the Whitworth Hall, Manchester, at which a congratulatory address will be presented from his old pupils, as well as addresses from a number of universities, colleges and learned societies. In connection with this occasion efforts have been made to communicate with as many as possible of the chemical students of the Owens College from 1856–1886. If any of these have been inadvertently overlooked they are requested to send their addresses as soon as possible to Dr. G. H. Bailey, the Owens College, Manchester.

THE second annual meeting of the South African Association for the Advancement of Science was opened at Johannesburg on Monday, when Sir Charles Metcalfe delivered the inaugural address. Lord Milner occupied the chair.

WE learn from the *Times* that the Canadian Government has purchased the steamer *Gauss*, which was built three years ago for the German Antarctic Expedition, and the vessel is now in Bremen Harbour. The *Gauss* is to be commanded by Captain Bernier and a picked Canadian crew, and is to be employed at once in conveying relief stores and coal to the Government steamer *Neptune*, at present wintering in Hudson Bay. Subsequently she will be engaged in survey work on the coast of Labrador. Captain Bernier hopes to be able to utilise the *Gauss* in 1905 in an attempt to reach the North Pole from Canada.

THE annual meeting of the Iron and Steel Institute of Great Britain will be held on Thursday and Friday, May 5 and 6. Upon that occasion the Bessemer gold medal for 1904 will be presented to Mr. R. A. Hadfield, vice-president, and the awards of the Andrew Carnegie gold medal and research scholarships for 1904 will be announced.

ON Tuesday next, April 12, Prof. L. C. Miall will deliver the first of three lectures at the Royal Institution on the transformations of animals, and on Thursday, April 14, Prof. Dewar will commence a course of three lectures on dissociation. The Friday evening discourse on April 15 will be delivered by Count Vay de Vaya on Korea and the Koreans, and on April 22 by Colonel David Bruce on sleeping sickness in Uganda.

THE foundation stone of a library which will be erected in connection with the British School at Athens as a memorial to the late Mr. F. C. Penrose, F.R.S., says the Athens correspondent of the *Daily Chronicle*, was laid last week by Lady Evans, in the presence of a distinguished gathering of diplomats and savants. The Greek Archæological Society has offered to present the Penrose Library with a bust of Mr. Penrose, in recognition of his great services to architecture and archæology.

THE death is announced of Prof. Arthur Greeley, professor of biology at Washington University, St. Louis.

M. JEAN DEBROUSSE has bequeathed an annual revenue of thirty thousand francs to the Institute of France "in the interests of letters, sciences and arts." At a recent special meeting the institute decided, says *La Nature*, to devote five thousand francs to the publication of lunar tables.

THE *British Medical Journal* states that Sir Michael Foster, F.R.S., has given notice that on April 12, the day on which Parliament reassembles after the Easter recess, he will ask the First Lord of the Treasury whether opportunity will be given to discuss in the House of Commons, before action is taken, the portion of the report of the War Office (Reconstitution) Committee which bears on the health of the army.

REUTER reports that repeated slight shocks of earthquakes were felt at Belgrade during the morning of April 4. A message from Philippopolis states that three earthquake shocks, the severest experienced during the last fifty years, were felt there between midday and 1 p.m. on April 4. The disturbance, which was from west to east, was accompanied by a loud rumbling noise; little damage was done to buildings in the city. Earthquake shocks are also reported to have occurred at several places in Greece on April 5.

MR. JOHN PATERSON writes to the *Times* that on a voyage from New York to Plymouth on August 29, 1903, in latitude N. 49° 43′, longitude W. 25° 35′, he threw into the Atlantic a mineral water bottle in which a note was enclosed. In a letter dated March 23 Mr. Paterson was informed that the bottle was found on the shore of the bay of Trevignon, near Concarneau, in Brittany, at high-water mark of the ordinary tides. Concarneau is in latitude 47° 50′ N. and longitude 4° W., so that the bottle travelled in an easterly direction 21° 35′ of longitude and went south 1° 53′ of latitude from the place where thrown into the sea.

THE New York correspondent of the *Daily Chronicle* states that Mr. Andrew Carnegie's gift of 300,000*l.* to provide a building for the various engineering societies in the city really involves an outlay of 500,000*l.*, for in addition to the amount given by Mr. Carnegie there is an investment of about 200,000*l.* for two lots which will be occupied by the proposed Union Home. The offer was made originally to the five great engineering societies of the United States:—American Society of Civil Engineers, Institute of Mining Engineers, Institute of Mechanical Engineers, Institute of Electrical Engineers, and the Engineers' Club. The first named society has, however, not accepted the offer.

IN a report on the German estimates for this year, Mr. Robertson, one of the secretaries to the British Embassy in Berlin, states that, in the new estimates, a sum of 800*l.* is inserted under the head "Furtherance of scientific, especially ethnological, studies in China." In explanation it is mentioned that, as the opening of China advances, a more exact study of the individuality of east Asiatic nations is becoming a necessity. It is therefore advisable to station permanently in China a German scholar well acquainted with ethnology and the Chinese language, whose object is to develop intellectual relations with a little known form of civilisation.

AN article upon the route of the Tibet Mission, by the special correspondent of the *Times*, contains an interesting record of temperatures and conditions of life at high altitudes. The mission has necessitated the continued exposure of a very large number of untried men to life at altitudes ranging between 10,000 feet and 15,700 feet, and the general results are of considerable value. The lowest temperature yet reached on the route has been −26° F. at Chuggia, on the Tang-la, which was, however, only an encampment. Of actual nightly exposure to cold of men and animals Tuna probably holds the record with −17° F. But Phari has repeatedly reached −15° F., and Kamparab, nine miles distance from Phari, might—if continual registration had been possible there—show a lower figure than either. The normal night *minimum* during January and February is probably −10° F. for 15,000 feet, warming to 7° F. for 10,000 feet. Mountain sickness has been closely observed by the medical men accompanying the mission. Indigestion has been common on account of the eating of imperfectly cooked food. At 15,000 feet water boils at a temperature about 30° F. lower than at sea-level, and the normal amount of cooking is therefore quite inadequate. At 15,000 feet it is almost impossible to boil rice properly. Dal—the common red lentil of India—affords a curious example of the difficulty of cooking at high elevations. Of the five different kinds of dal supplied to the troops—Mussoor, Urad, Arhar, Moong, and Chenna—only the first is capable of being cooked at all at heights above 10,000 feet. It is difficult to make the native understand these aberrations of gastrology, and a great deal of insufficient cooking has been the natural result.

THE subdirector of the Norwegian Meteorological Institute, Mr. A. S. Steen, has contributed to the *Proceedings* of the Christiania Society of Sciences an interesting paper on the diurnal variation of terrestrial magnetism, and on the possible connection of this phenomenon with meteorology. The author points out that, so far as the accuracy of weather forecasts is concerned, we stand now nearly in the same position as we stood some twenty-five years ago; the distribution of atmospheric pressure and temperature is often quite different from what might have been expected from the telegraphic reports of the previous day, and leaves the impression that there are unknown factors in cooperation. He considers that too little attention has been paid to the electrical conditions of the atmosphere, and that such investigations as have been carried on in this sense are vitiated by the observations being generally made in the lowest strata of the atmosphere. Prof. Schuster's investigations point to the probable connection of electrical currents in the atmosphere and the diurnal variation of the terrestrial magnetic elements, and Dr. von Bezold goes so far as to imagine a connection between the latter and certain meteorological phenomena. In the paper in question Mr. Steen has searched the hourly magnetic observations of eighteen stations during the polar year (1883), and has found a continuous calm period of forty-eight hours between March 18 and 20, and this period he has submitted to special examination. The author considers that, when viewed in conjunction with the researches of Schuster and von Bezold, the results arrived at are so promising as to call for wider investigations with more ample materials than were at his disposal.

IN the *Physikalische Zeitschrift*, Dr. A. Korn describes a new receiver for telautography and the telegraphic transmission of half-tone process blocks. In the transmitting apparatus the writing or the points and lines of the half-tone block are formed by a non-conducting ink on a sheet of metal foil. This is wrapped round the surface of a cylinder which is rotated with uniform angular velocity. The electric current is transmitted by means of a metal pen which moves forward 0·01 inch in each revolution. In the receiving apparatus the cylinder is rotated with an angular velocity greater by 1 per cent. than in the transmitting apparatus, and at the end of each revolution it is made to await a synchronising signal by which it is restarted. The impression at the receiving station is produced on sensitised paper by a small electric lamp or vacuum tube, which by means of a suitable relay for Tesla currents is made to glow whenever the pen at the transmitting station passes over a non-conducting portion of the picture. The paper is illustrated by specimens of handwriting transmitted by this method.

IN the *Popular Science Review* for March, Mr. O. Chanute gives a survey of progress in aërial navigation in a paper read by him before the American Association in December last.

M. JULES BAILLAUD, in a recent number of the *Journal de Physique*, sums up the opinion of the Graz conference on the firing of cannon for the prevention of hail by the following statistics:—out of fifty experts eight considered the method efficacious, nine found the efficacy doubtful but probable, thirteen found it simply doubtful, fifteen found it doubtful and improbable, and five found it *nil*.

AN experiment showing the production of high frequency currents by means of the telephone has been exhibited by M. Ducretet before the French Physical Society. The apparatus employed was the loud speaking telephone of MM. R. Gaillard and E. Ducretet. The microphone and the receiver were placed in circuit with a battery of about 10 volts, so as to give a current of about half an ampere. By suitably regulating the distance between the receiver and microphone free oscillations were set up which could be maintained indefinitely, and these were increased in intensity by connecting the microphone and receiver with a metal tube.

THE second part of vol. lxxvi. of the *Zeitschrift für wissenschaftliche Zoologie* contains two articles of a highly technical nature, the one, by Mr. F. Schwangart, on the

question of the origin and structure of the epithelial lining of the alimentary tube in the Lepidoptera, and the other (which is to be continued), by Mr. E. Bresslau, on the developmental history of the turbellarian worms.

IT is satisfactory to learn from the scientific investigation report of the Northumberland Sea-Fisheries Committee for 1903 that, in spite of some local diminution, the improvement in the results from trawling, to which attention had been previously directed, is maintained, if the results of the whole period are taken into consideration. It is added that while the season has not been so good for the salmon and herring fishing, "white fish" have yielded better than in the previous year. Small fish have been measured, marked and returned to the sea. A few of these have been recaptured near the same places, and one in another bay. Other experiments tend to show that the migration of crabs is not so simple as has been hitherto supposed.

THE *Boletim* of the Goeldi Museum at Para contains an annotated catalogue, by Messrs. Goeldi and Haymann, of the species of local mammals represented in the collection. It is somewhat remarkable to find among these a species of stoat (*Mustela*, or *Putorius, paräensis*), but there can be little doubt that this, although now domiciled in the country, was originally introduced by human agency. Two very spirited plates illustrate the paper, one showing the extraordinary width and straightness of the opening of the mouth in one of the howling-monkeys (quite unlike what we are accustomed to see in museum specimens in this country), and the other the head of one of the indigenous species of cat. Mr. O. Thomas contributes an appendix to the catalogue, in which two subspecies are described as new.

THREE out of the four articles in the current number of the *Zoologist* are devoted to bird subjects. In the fourth Mr. A. H. Cocks reverts to the subject of the gestation of the badger, and arrives at what he confesses to be the very remarkable conclusion "that the pairing may take place at any time during a range of some ten months, and yet that the young are always born within a season limited to about six weeks. In other words, it appears that the gestation may amount to anything between under five and over fifteen months, and yet that the young are all born within some six weeks of each other; and, moreover, that the females which paired earliest by no means necessarily whelp earlier during the six weeks' season than others which paired several months after them."

THE necessity of carefully studying the anatomy of the smaller mammals, instead of restricting our attention to the description of new subspecies founded mainly on colour, is exemplified by certain notes on the insectivorous genus Tupaia contributed by Dr. H. C. Chapman to the *Proceedings* of the Philadelphia Academy for March. These serve to show that the presence of a cæcum is by no means, as has hitherto been supposed, a constant feature of that genus. The paper concludes with a discussion on the phylogeny of the Primates, in which a provisional table of descent is sketched. In view of the researches of other biologists it is somewhat remarkable to find Chiromys figuring as the ancestor of the rodents, and Tarsius as the parent form of the insectivores, while it is scarcely less surprising to see American monkeys placed between the lorises and the monkeys of the Old World in a direct phylogenetic line. It is, however, only just to the author to mention that in the text he states that some of these suggested relationships may have to be reconsidered.

THE report of the medical officer of health of the City of London for the four weeks ending March 12 details the inspection of kitchens of restaurants, &c., commenced early in the year 1902, and now just completed. There appear to be no less than 909 kitchens in the district, employing 9888 men and women. In the course of the inspection 1996 various sanitary defects were found. It would appear that the Factory and Workshop Act 1901 is adequate to deal with this class of work-place.

IN the *Empire Review* for March Dr. Cooke Adams contributes an article on cancer research in Australia. His statistics show that the death rate from cancer in Australia among the British born is nearly double that among the Australian born portion of the population, being, for the age period of thirty-five years and upwards, 12·5 for the former and 6·9 for the latter per 100 deaths. Among the aborigines cancer appears to be practically unknown, although a large number live to the age period at which the disease chiefly manifests itself.

"PROTOZOA and Disease" is the title of an article in the *Century Magazine* by Dr. Gary Calkins. After some introductory remarks on the classes of protozoa and their life-history, the protozoan parasites causing certain diseases in the lower animals and in man are described, viz. diseases of the mole and of brook trout, malaria, scarlatina and small-pox. In scarlatina Dr. Mallory has met with structures which he considers to be protozoan organisms, and in small-pox Dr. Councilman believes that a protozoon is the cause, and that it attacks the nuclei of the cells of the skin. In vaccinia Dr. Councilman describes an organism similar to that of small-pox, but differing from the latter in that it attacks the cell bodies and not the nuclei. The article is illustrated with several excellent figures.

THE last number of the *Izvestia* of the Russian Geographical Society (xxxix., 5) contains the results of an inquiry, by G. E. Grum Grzimailo, into the origin of the populations of eastern Tibet and the Kuku-nor region, the conclusion of the paper being that the presence of a white race element in the population of eastern Tibet is very probable. Another paper of scientific interest is the report by Captain Serghievsky on the pendulum observations made in Russia during the last five years. Relative determinations only, by means of the Sterneck apparatus, were carried on, those regions which offered interesting anomalies being made the subject of detailed studies, namely, the region of the well known pendulum anomaly in Kursk, the Caucasus, Turkestan (in order to ascertain the disturbing influence of the Pamir), the region covered by the geodetic triangulation for the measurement of an arc of the meridian in connection with the Spitsbergen measurements, and the stretch between Pulkova and Dorpat.

IN an essay entitled "Prehistoric Pile-structures in Pits," Mr. L. M. Mann records the results of excavations made at Stoneykirk, in Wigtownshire (*Proc.* Soc. Antiq., Scotland). The discovery of these early inhabited sites was due to Mr. A. Beckett, who directed attention to a row of depressions in the land, situated on the edge of a plateau. The depressions proved to be silted-up pits. In one of them, at a depth of 7 feet, there were found decayed "logs of round timber more or less vertically placed." In the silted material chips, cores, implements of flint and of other stones, as well as charcoal and fragments of pottery were found. Twigs and branches belonging to supposed wattle-work were likewise obtained. There was evidence which tended to show that the timber had been shaped by stone axes. It appears probable that the pits were used as shelters or sleeping places and workshops. The fact that the lowest stratum met with was a bluish clay suggests that a struc-

ture of wooden piling was erected in order to provide a dry floor. The ornamentation on the pottery and other evidence point to the Neolithic age as the period during which the sites were in use.

AN article on the structure of the Upper Cretaceous turtles of New Jersey is contributed by Mr. G. R. Wieland (*Amer. Journ. Sci.*, February). The genera Adocus, Osteopygis and Propleura are described and figured.

THE Hurricane Fault in the Toquerville district of Utah furnishes a theme for an essay on the effects of faulting on the scenery in the region of the Grand Canyon; it is written by Messrs. E. Huntington and J. W. Goldthwait (*Bull.* Museum Comp. Zool., Harvard Coll. Geol. Series, vi.. No. 5, February).

WE have received the report of progress for 1903 of the University of Texas Mineral Survey, which is under the direction of Mr. W. B. Phillips. The work is carried on with especial reference to economic geology. Attention is directed to the study of the clays of Texas, by Dr. H. Ries. Under a plan of cooperation with the Texas World's Fair Commission, Dr. Ries examined the chief clay producing districts in the State, and as a result there will be exhibited at St. Louis samples of the clays, to each of which will be attached a card giving the locality, chemical composition and physical characters, such as fusibility, plasticity, strength, colour on burning, proper temperature for burning, suitability for various purposes, &c.

AN interesting essay on periodic migrations between the Asiatic and the American coasts of the Pacific Ocean is contributed by Mr. J. P. Smith (*Amer. Journ. Sci.*, March). It is shown that the living faunas of the Japanese province and of the western coast of North America are rather closely allied with a large number of species in common, and they live under approximately the same conditions. Between them there lie the southern shores of Alaska and the Aleutian Islands, interrupted by the deep channel east of Kamchatka and in this region the warm Japan current is met by the cold current from the Bering Sea, whereby the Alaskan waters and those along the shores of California are tempered. At present the migration of shallow water species is stopped by the depth of the channel at the end of the Aleutian chain, and also by the cold water which extends south-westward from Bering Sea. A rise of 200 metres would close Bering Sea, cutting off the Arctic waters, and providing a broad land bridge between Alaska and Siberia. An uprise of this, or of greater extent, in recent geologic times would allow of the intermigration of marine Mollusca between the Japanese area and that of western America, and this is the only explanation of the present distribution of most of the species that are common to the two regions. By such changes we can understand the history of the past faunas, which do not form a genetic series, but rather one showing periodically diverse origin and characters. Thus the faunal relations between western America and eastern Asia from the Trias to the present were the same, Asiatic facies alternating with periodically recurring invasions of the Boreal type. It is concluded, therefore, that there is no presumption against the contemporaneity of similar species in widely separated regions in the past.

ALL the volumes of the first annual issue of the "International Catalogue of Scientific Literature" have now been published, and the volumes of the second annual issue are appearing. The first catalogue of zoological literature is in two parts—one an authors' and the other a subject catalogue—and they are concerned with the publications of 1901. Of the second issue, we have received the volumes dealing with mechanics, physics, astronomy and bacteriology. The volumes can be obtained from Messrs. Harrison and Sons, St. Martin's Lane, W.C.

THE second number of *The Central*—the magazine of the old students' association of the Central Technical College—contains several articles of practical value. Profs. W. C. Unwin and A. G. Ashcroft describe the engineering course and laboratories at the college, Mr. R. S. Dahl gives an account of the design of small motors, Mr. J. M. Donaldson contributes an article on electric power in the City of Montreal, and the work of Dr. T. M. Lowry and Dr. E. F. Armstrong on the mutarotation of glucose is briefly described. A photogravure of Prof. Henrici forms the frontispiece of the number.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, two Bare-eyed Cockatoos (*Cacatua gymnopis*) from South Australia, presented by Miss Hester Forshaw; a Hairy-footed Jerboa (*Dipus hirtipes*) from Egypt, presented by Mr. A. Lethbridge; a Shining Weaver-bird (*Hypochera nitens*), a Common Waxbill (*Estrelda cinerea*) from West Africa, an Orange Weaver-bird (*Euplectes franciscana*), three African Silver-bills (*Munia cantans*) from North-east Africa, three Banded Grass Finches (*Poëphila cincta*) from Queensland, four Amaduvade Finches (*Estrelda amandava*) from India, a Fire-tailed Finch (*Erythrura prasina*) from Java, a Red-headed Weaver-bird (*Foudia madagascariensis*) from Madagascar, presented by Mrs. M. Summers; a Potto (*Perodicticus potto*), an African Civet Cat (*Viverra civetta*), two Crowned Cranes (*Balearica pavonina*), a White-throated Monitor (*Varanus albigularis*) from Lagos, presented by Dr. McFarlane; a Loggerhead Turtle (*Thalassochelys caretta*) from tropical seas, deposited; an American Flying Squirrel (*Sciuropterus volucella*) from North America, a Boatbill (*Cancroma cochlearia*) from South America, purchased.

OUR ASTRONOMICAL COLUMN.

OBSERVATIONS OF EROS.—In one of the papers included in the *Decennial Publications* of the University of Chicago Prof. E. E. Barnard publishes the results of the micrometrical observations of Eros made at the Yerkes Observatory with the 40-inch refractor during the opposition of 1900–1901. After describing the methods of observation and discussing the errors, he gives, in tabular form, the details of each of the 7500 individual "settings" made during the series of observations. He also gives the results of a set of observations which were made during 1898 and 1900, but have not previously been published.

At the time these measures were made the oscillations of the magnitude of Eros had not been recognised, but on looking through the records Prof. Barnard discovered that the planet had often been compared, in regard to its brightness, with the reference stars, and he therefore appends the actual notes regarding the relative magnitude which were made during the period September, 1898, to January, 1901, inclusive.

ORBIT OF THE MINOR PLANET CHICAGO (334).—Another paper of the *Decennial Publications* (Chicago) contains a discussion of the orbit of the minor planet (334) by Prof. Kurt Laves. In the introduction the author discusses the minor planets of the Hilda type in regard to their "libration," and gives, in algebraical form, the inequality which is the criterion of the existence of libration in the orbits of these bodies. He then discusses the development of the